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What is claimed is:

1. A front light, comprising:

a light source;

a light guide plate; and

a plurality of prism-shaped lenses each being contact with
a lower surface of the light guide plate,

wherein a cross-section of each of the prism-shaped lenses,
in a plane perpendicular to the side surfaces thereof, has a shape
of equally-sided trapezoid;

a plane defined by an upper base of the equally-sided
trapezoidal cross-section of each of the prism-shaped lenses comes
into contact with the lower surface of the light guide plate; and

an obtuse angle ϕ of the equally-sided trapezoidal
cross-section and a critical angle θ for the total reflection of
the prism-shaped lenses satisfy the relationship of $90^\circ < \phi \leq 90^\circ$
 $+ \theta$.

2. A front light, comprising:

a light source;

a light guide plate; and

a plurality of prism-shaped lenses each being in contact with
a lower surface of the light guide plate,

wherein a cross-section of each of the prism-shaped lenses,

in a plane perpendicular to the side surfaces thereof, has a shape of an axially-symmetric figure that is enclosed with a pair of opposing parallel straight lines and a pair of opposing curved lines and is axially symmetric with respect to a straight line connecting middle points of the respective opposing parallel straight lines;

each of the prism-shaped lenses is in contact with the light guide plate in a plane including a shorter one in the pair of opposing parallel straight lines; and

in the axially-symmetric figure, an angle defined between a normal at a certain point on one of the opposing curved lines and a straight line connecting a crossing point between the other opposing curved line and the shorter one in the pair of opposing parallel straight lines to the certain point, is in the range of $\pm 3^\circ$ from a critical angle for the total reflection of each of the prism-shaped lenses.

3. A front light according to claim 1 or 2, wherein a refractive index of each of the prism-shaped lenses is equal to that of the light guide plate.

4. A front light according to claim 1 or 2, wherein each of the prism-shaped lenses is made of the same material as the light guide plate.

~~5~~ A front light, comprising:
~~DLK~~
a light source;
a light guide plate; and
a plurality of rotational-body lenses each being in contact with a lower surface of the light guide plate,

wherein each of the rotational-body lenses has a shape of solid of revolution obtained by rotating an axially-symmetric figure, that is enclosed with a pair of opposing parallel straight lines and a pair of opposing curved lines and is axially symmetric with respect to a straight line connecting middle points of the respective opposing parallel straight lines, around said straight line;

in the axially-symmetric figure, an angle defined between a normal at a certain point on one of the opposing curved lines and a straight line connecting a crossing point between the other opposing curved line and a shorter one in the pair of opposing parallel straight lines to the certain point, is in the range of $\pm 3^\circ$ from a critical angle for the total reflection of each of the rotational-body lenses; and

each of the rotational-body lenses is in contact with the light guide plate in a plane including the shorter one in the pair of opposing parallel straight lines.

6. A front light according to claim 5, wherein a refractive index of each of the prism-shaped lenses is equal to that of the

light guide plate.

7. A front light according to claim 5, wherein each of the prism-shaped lenses is made of the same material as the light guide plate.

~~8.~~ 8. An electronic device, comprising:

a liquid crystal panel; and

a front light for illuminating the liquid crystal panel,

wherein the front light comprises: a light source; a light guide plate; and a plurality of prism-shaped lenses each being contact with a lower surface of the light guide plate, wherein a cross-section of each of the prism-shaped lenses, in a plane perpendicular to the side surfaces thereof, has a shape of equally-sided trapezoid;

a plane defined by an upper base of the equally-sided trapezoidal cross-section of each of the prism-shaped lenses comes into contact with the lower surface of the light guide plate; and

an obtuse angle ϕ of the equally-sided trapezoidal cross-section and a critical angle θ for the total reflection of the light guide plate satisfy the relationship of $90^\circ < \phi \leq 90^\circ + \theta$.

~~9.~~ 9. An electronic device, comprising:

an optical sensor; and

a front light for illuminating an object to be read by the optical sensor,

wherein the front light comprises: a light source; a light guide plate; and a plurality of prism-shaped lenses each being in contact with a lower surface of the light guide plate,

wherein a cross-section of each of the prism-shaped lenses, in a plane perpendicular to the side surfaces thereof, has a shape of equally-sided trapezoid;

a plane defined by an upper base of the equally-sided trapezoidal cross-section of each of the prism-shaped lenses comes into contact with the lower surface of the light guide plate; and

an obtuse angle ϕ of the equally-sided trapezoidal cross-section and a critical angle θ for the total reflection of the light guide plate the relationship of $90^\circ < \phi \leq 90^\circ + \theta$.

10. An electronic device, comprising:
a liquid crystal panel; and
a front light for illuminating the liquid crystal panel from a display screen side thereof,

wherein the front light comprises: a light source; a light guide plate; and a plurality of prism-shaped lenses each being in contact with a lower surface of the light guide plate,

wherein a cross-section of each of the prism-shaped lenses, in a plane perpendicular to the side surfaces thereof, has a shape

of an axially-symmetric figure that is enclosed with a pair of opposing parallel straight lines and a pair of opposing curved lines and is axially symmetric with respect to a straight line connecting middle points of the respective opposing parallel straight lines;

each of the prism-shaped lenses is in contact with the light guide plate in a plane including a shorter one in the pair of opposing parallel straight lines; and

in the axially-symmetric figure, an angle defined between a normal at a certain point on one of the opposing curved lines and a straight line connecting a crossing point between the other opposing curved line and the shorter one in the pair of opposing parallel straight lines to the certain point, is in the range of $\pm 3^\circ$ from a critical angle for the total reflection of each of the prism-shaped lenses.

~~11. An electronic device, comprising:~~

~~an optical sensor; and~~
a front light for illuminating an object to be read by the optical sensor.

wherein the front light comprises: a light source; a light guide plate; and a plurality of prism-shaped lenses each being in contact with a lower surface of the light guide plate,

wherein a cross-section of each of the prism-shaped lenses, in a plane perpendicular to the side surfaces thereof, has a shape

of an axially-symmetric figure that is enclosed with a pair of opposing parallel straight lines and a pair of opposing curved lines and is axially symmetric with respect to a straight line connecting middle points of the respective opposing parallel straight lines;

each of the prism-shaped lenses is in contact with the light guide plate in a plane including a shorter one in the pair of opposing parallel straight lines; and

in the axially-symmetric figure, an angle defined between a normal at a certain point on one of the opposing curved lines and a straight line connecting a crossing point between the other opposing curved line and the shorter one in the pair of opposing parallel straight lines to the certain point, is in the range of $\pm 3^\circ$ from a critical angle for the total reflection of each of the prism-shaped lenses.

12. An electronic device according to ~~any one of claims 8 to 11~~, wherein a refractive index of each of the prism-shaped lenses is equal to that of the light guide plate.

Claim 8
13. An electronic device according to ~~any one of claims 8 to 11~~, wherein each of the prism-shaped lenses is made of the same material as the light guide plate.

14. An electronic device, comprising:

a liquid crystal panel; and a front light for illuminating the liquid crystal panel from a side of a display screen thereof, wherein the front light comprises: a light source; a light guide plate; and a plurality of rotational-body lenses each being in contact with a lower surface of the light guide plate,

wherein each of the rotational-body lenses has a shape of solid of revolution obtained by rotating an axially-symmetric figure, that is enclosed with a pair of opposing parallel straight lines and a pair of opposing curved lines and is axially symmetric with respect to a straight line connecting middle points of the respective opposing parallel straight lines, around said straight line;

each of the rotational-body lenses is in contact with the light guide plate in a plane including a shorter one in the pair of opposing parallel straight lines; and

in the axially-symmetric figure, an angle defined between a normal at a certain point on one of the opposing curved lines and a straight line connecting a crossing point between the other opposing curved line and the shorter one in the pair of opposing parallel straight lines to the certain point, is in the range of $\pm 3^\circ$ from a critical angle for the total reflection of each of the rotational-body lenses.

13. An electronic device, comprising:

an optical sensor; and

a front light for illuminating an object to be read by the optical sensor,

wherein the front light comprises: a light source; a light guide plate; and a plurality of rotational-body lenses each being in contact with a lower surface of the light guide plate,

wherein each of the rotational-body lenses has a shape of solid ~~of~~ of revolution obtained by rotating an axially-symmetric figure, that is enclosed with a pair of opposing parallel straight lines and a pair of opposing curved lines and is axially symmetric with respect to a straight line connecting middle points of the respective opposing parallel straight lines, around said straight line;

each of the rotational-body lenses is in contact with the light guide plate in a plane including a shorter one in the pair of opposing parallel straight lines; and

in the axially-symmetric figure, an angle defined between a normal at a certain point on one of the opposing curved lines and a straight line connecting a crossing point between the other opposing curved line and the shorter one in the pair of opposing parallel straight lines to the certain point, is in the range of $\pm 3^\circ$ from a critical angle for the total reflection of each of the rotational-body lenses.

a 16. An electronic device according to claim 14 or 15, wherein a refractive index of each of the rotational-body lenses is equal

to that of the light guide plate.

a 17. An electronic device according to claim 14 ~~or~~ 15, wherein each of the rotational-body lenses is made of the same material as the light guide plate.

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